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HOME CURING FISH

*A Guide for Extension
and Village Workers
in Many Countries*

Federal Extension Service
United States Department of Agriculture
in cooperation with the Agency for International Development
United States Department of State



This is for
YOU
The Home Economics Extension
Worker or
Village Worker

The information in this booklet is based on experiences of extension workers like yourself in many countries. You'll find ideas to help you teach families how to home cure fish better.

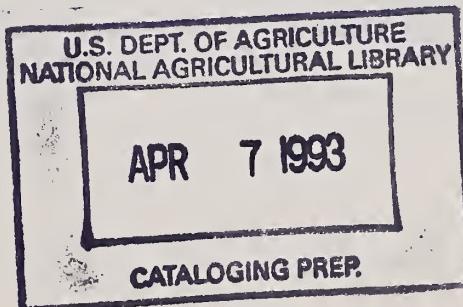
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BY SUE T. MURRY

Issued July 1967

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HOW TO CURE FISH AT HOME

Fish is an important food. It is a protein. Your body must have protein to make muscles, tissues, bones, and blood. Protein is especially important for children who need this kind of food to grow and be strong and healthy. Both young and old should eat fish if they can.

Most people like fish. But many people do not eat enough fish because it spoils quickly. When you catch more fish at one time than you can use quickly, curing is a way to keep them. Families in many countries do this.

Curing fish at home can mean you will have more fish to eat all year. Curing takes simple equipment and may cost little or nothing.

Easy methods are:

1. Salting and air drying
2. Salting and smoking

Both salt water and fresh water fish can be cured. "Lean" type fish can be cured more readily and will keep longer than the "fat" type. Lean fish usually have white or very light-colored flesh. Fat fish usually have darker colored flesh.

When you cure fish at home, take great care to keep cats, flies, dogs, and all other animals away from the fish. Do not let anything that has not been thoroughly cleaned touch the fish. Scrub all your utensils and equipment with soap and clean, safe water. Have the water hot if you can. *This is very important.*

CATCHING AND HANDLING FISH

The way you catch and handle fish is important. When the weather is warm and fish are caught a long way from home, you must take great care to keep them from spoiling before you get them home. Fish caught with a trap, small seine, handline, or trawl generally keep better than fish caught with gill nets because they struggle less. Do not bruise fish by rough handling. Do not step on them or knock them around.



Keep Fish Fresh

Keeping fish alive is the best way to keep them fresh until you can start curing them. If fish are small, keep them alive in a container of water or "live well."

A live well is a container made of slats or screen wire. Set the container in the water and weigh it down or tie it so that the water will circulate through it and the fish will not thrash around.

If the container is made of slats, be sure the space between the slats is small enough so the fish cannot get out. Also be sure they cannot swim or jump out the top. You will need a cover.

If they cannot be kept alive until you get them home, kill, bleed, and clean them immediately after taking them out of the water. (See HOW TO CLEAN FISH.) Fish begin to lose freshness as soon as they die. Cleaned fish stay good longer than dead fish that have not been cleaned. Never try to keep fish after they die unless you clean them.



Keep Fish Cool

After fish have been killed, they spoil quickly, unless they are kept very cool. The best way to keep them cool is with ice. If you have no ice there are other ways to keep fish reasonably cool until you can get them home.

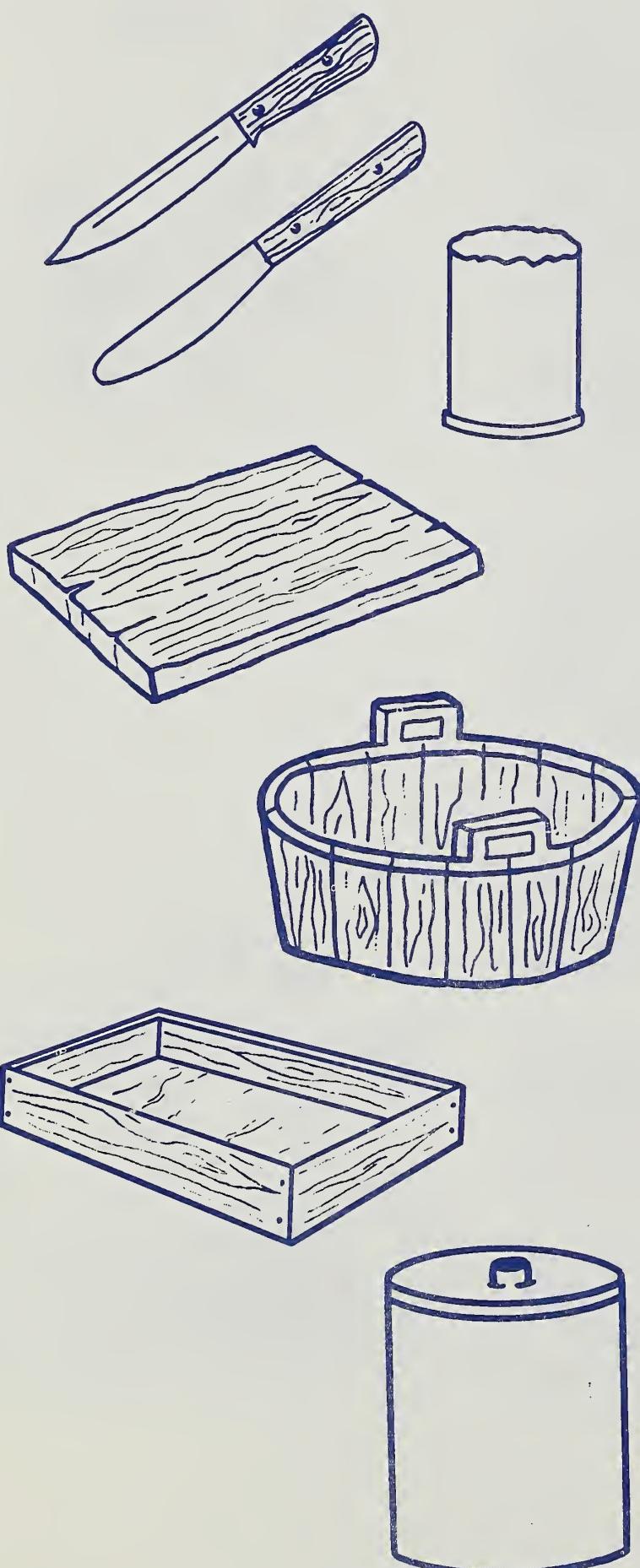
Put cleaned fish in a clean basket, box, or container of coarse screen wire. Keep them in the shade. Cover the cleaned fish with several thicknesses of clean wet burlap, heavy cloth or leaves. Keep the covering damp. Be sure whatever you use is clean.

Let air circulate. Do not let the cloth rest on the fish. Lay small sticks across the container to hold it up. Water evaporating from the cover will keep the fish cool.

Remember fish will only keep a few hours unless you use ice.

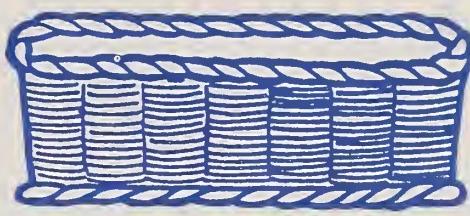


WHAT YOU'LL NEED FOR CLEANING AND CURING FISH

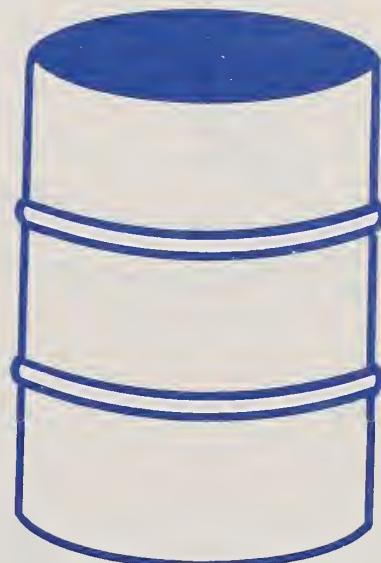


1. Sharp clean knife.
To cut and clean fish.
2. Clean scraper.
To scrape scales.
3. Container.
For the waste—trimmings, scales, guts.
4. Clean wooden board.
To lay fish on to clean and cut.
5. Clean pan, kettle, tub or pail.
To wash fish in.
6. Shallow wooden box.
To hold salt.
7. Clean crock or keg that does not leak.
To pack fish in for wet salting.

8. Clean boxes, baskets, mats, trays, or other containers that will permit brine to drain off for dry salting.



9. Oil drums or metal barrels, racks, and trays.
For smoking.



10. Clean baskets, boxes, or containers.
To store cured fish.



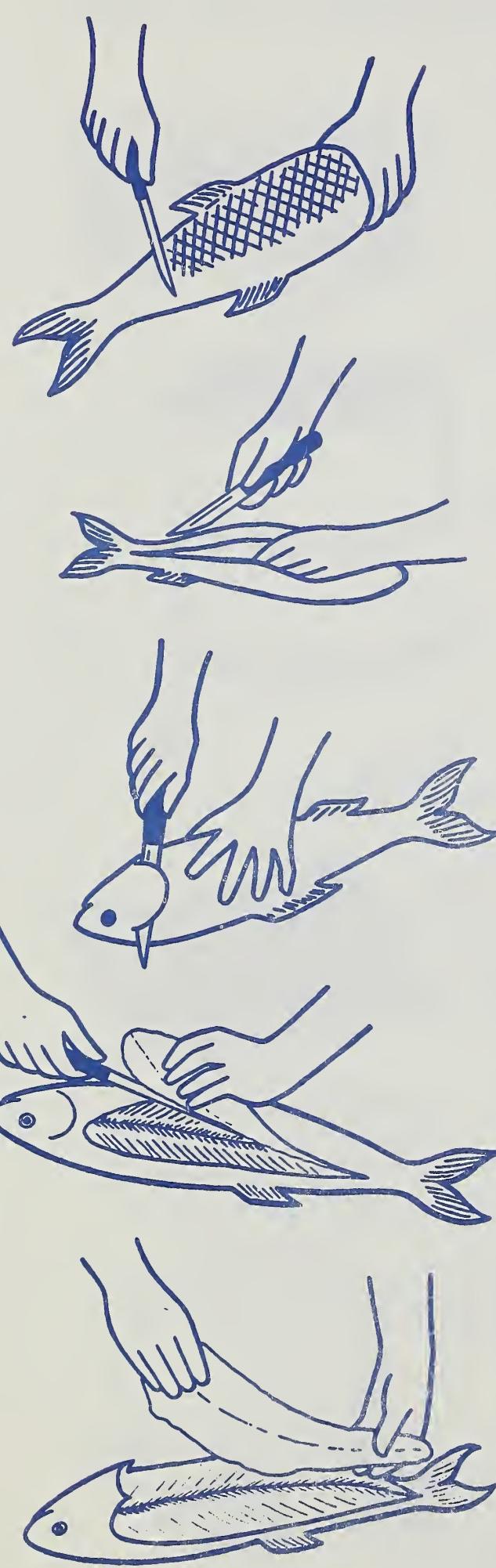
11. Clean mats or screen wire frames.
To place fish on to dry.

12. Clean safe water—water that has been boiled 10 minutes, then cooled.
To wash fish.
To make brine.



13. Clean salt.

HOW TO CLEAN FISH



Fish will keep better if they are killed and cleaned as soon as they are taken from the water. Bleed the fish by cutting the throat and pulling out the gills. Clean the fish right after you bleed it.

Remove the scales by scraping from the tail toward the head with a dull, clean knife or the backside of a sharp knife. On medium or large fish, remove the skin if it is thick or spiny—finned with large scales.

Slit small fish down the belly and remove the entrails. Fish up to eight inches (20 cm.) long or up to 1/4 pound (about 115 grams) in weight are small. Do not cut off the heads of small fish.

For medium and large fish, cut off the head but leave the hard, bone collar plates. If these are not left, the fish will shred apart during curing.

After the fish is split, clean out all traces of blood and intestines. In larger fish scrub the inside of the belly cavity with a clean piece of coarse sacking to remove the black skin and to clean away the blood, membrane, and bits of intestines that might be left.

Split medium and large fish into two sides by removing the backbone. Cut down the left side of the backbone with the knife edge slanted so that it scrapes the backbone. If you hold the knife blade level, you will leave much flesh on the backbone. Cut down to the tail so that the upper side comes off the backbone in one piece. Turn the fish over and do the same to the other side; now remove the backbone. The fish is now separated into two sides or "fillets."

Wash the insides of all fish thoroughly in clean safe water. When the insides of fish are not well cleaned, fish begin to spoil sooner than if they had not been cleaned at all.

Wash all the slime off the skin. Rinse the fish well in fresh, safe water. Rub both the inside and the outside of each fish with plenty of fine salt.

SALTING FISH

Salting is an important step in good curing. If you get a lot of salt into the fish, it will cure better and keep longer. The salt you use to cure fish should be as dry and as clean as possible. A mixture of fine and coarse salt is best to use. Finely ground salt goes into the fish faster. Coarse salt is good to keep the pieces apart so the brine can circulate. However, you can use what you have. "Solar salt", which is salt from sea water, is good. "Rock salt" should be pounded fine before you use it.

If the salt you have is not as clean as it should be, the cured fish may develop a somewhat reddish color, but it is still all right to eat. If you want to keep down this reddening, heat the salt before you use it. Put the salt in a flat pan and heat it over the open fire or in an oven. Get it so hot you can't touch it with your hands. Be sure to let the salt get thoroughly cold before you use it.

How to Salt Small Fish

You can salt small fish whole. Heads can be left on but intestines and all blood must be removed.

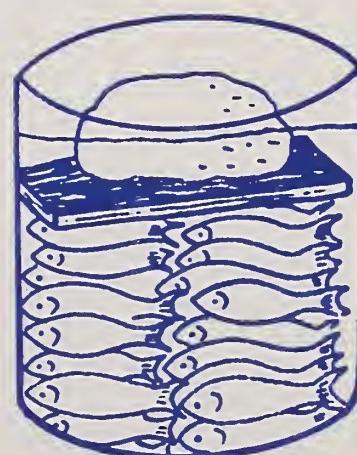
After the fish have been thoroughly cleaned and washed:

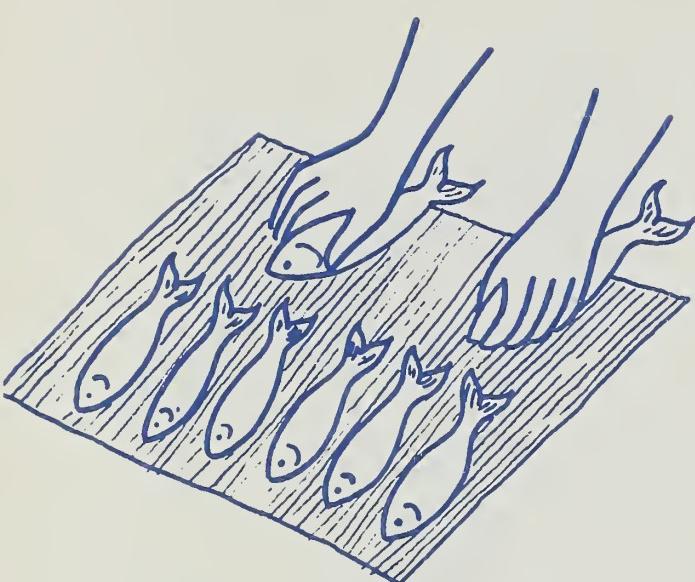
Step 1—Soak the fish for 1/2 to one hour in a weak brine.

Make the brine by mixing one cup of salt in one gallon of clean water (about 300 grams of salt per four liters of water.) This soaking is important to draw out all the blood. Take the fish out of the brine and wash it in clean, safe water.

Step 2—Now put the fish in a strong brine. To make it, mix one part salt to four parts clean, safe water by weight. Stir the brine very well before you add the fish. All the salt should be dissolved. If the fish sink, add more salt.

Step 3—Cover the fish in the container with a clean piece of wood or matting and weight it down with clean stones so the fish are completely covered with brine. Leave them in the brine for five to six hours. Let bigger fish stay in the brine longer than very small ones.





Step 4—Take the fish from the brine. Put them out to drain in a single layer on a wire screen, coarsely woven mat, or bamboo rack. Do not overlap the fish. Cover them with thin, clean white cloth or mosquito netting. Do not let the netting rest on the fish. They are now ready for AIR DRYING or SMOKING.

How to Salt Medium and Large Fish

Preparation



After medium and large fish have been cleaned, separated into two sides, and thoroughly washed, you must do several other things before they are ready for the final salting.

Step 1—If the fish is 12 inches (30 cm.) or longer, cut it into smaller pieces about six inches long or into strips. This helps each piece take salt quickly.

In "fat-type" fish, use a knife to make slanting cuts in thick pieces so that the salt can get through it easily and quickly.

Step 2—Place the pieces of fish in a weak brine made of one cup salt to one gallon safe water (about 300 grams per four liters.) Soak for 1 1/2 hours to draw out the blood and slime.

Step 3—Remove the fish from the brine and lay the pieces on a wire or bamboo rack to drain. Do not overlap the pieces of fish.

Step 4—Fill a shallow box with dry salt. Rub the salt into the fish well, including all the cut places, so that every part of the surface is coated. Put more salt into the thicker places. Try to get as much salt on each piece as will cling to it when you pick it up.

Step 5—At this point the fish can be packed into a container for either wet salting or dry salting. After salting, they can be either air dried or smoked.

Salting

To wet salt fish, use a container that does not leak. This may be a crock or keg that will hold the brine that forms on the salted fish. When the container is filled with layers of salt and fish, put a weight on top to hold the fish down in the brine.

In dry salting, containers that do leak, such as boxes or baskets, are used to let the brine drain away. No weights are needed on top of the fish.

The steps for preparing and salting the fish are the same for both dry and wet salting. The difference is in the containers, and in the use of weights on top for wet salting.

Step 1—Measure out the proper amounts of salt and fish—one part salt to three parts fish—before you start. Then you can spread the salt evenly throughout the container. Using too much salt may “burn” the fish, too little may allow fermentation and spoiling during curing.

Step 2—Scatter a thin layer (about 1/4 inch) of salt on the bottom of a clean container. There should be enough salt to completely cover the bottom.

Step 3—Arrange the fish, skin side down, in an even layer on the bottom of the container. You can slightly overlap the thin edges. Be sure you do not make a layer thicker than the thickest piece of fish. Scatter another thin layer of salt to completely cover the fish. Put the salt thickest over the thick part of the fish.

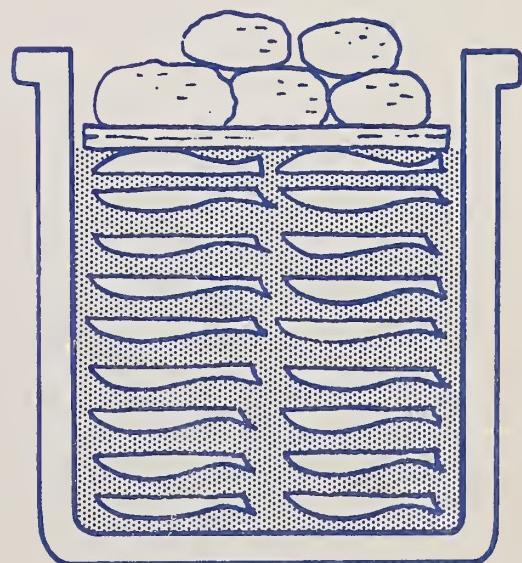
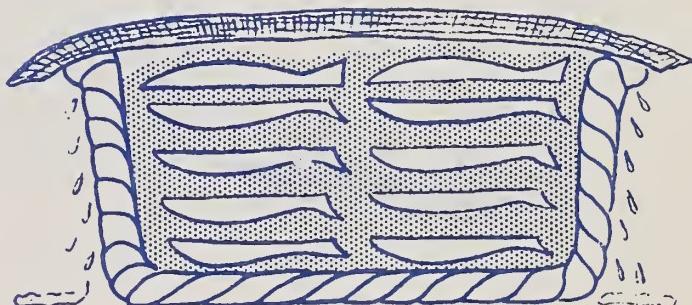
Step 4—Finish filling the container with alternate layers of fish and salt. Pack the top layer with the skin side up. Put another layer of salt on top to cover the fish well. In the dry salt method, the brine will drain away.

Step 5—If you are using the wet salt method, place a loose wooden cover on the top. Weight it down with rocks or bricks that you have washed thoroughly. Brine will make itself. The brine should cover the fish.

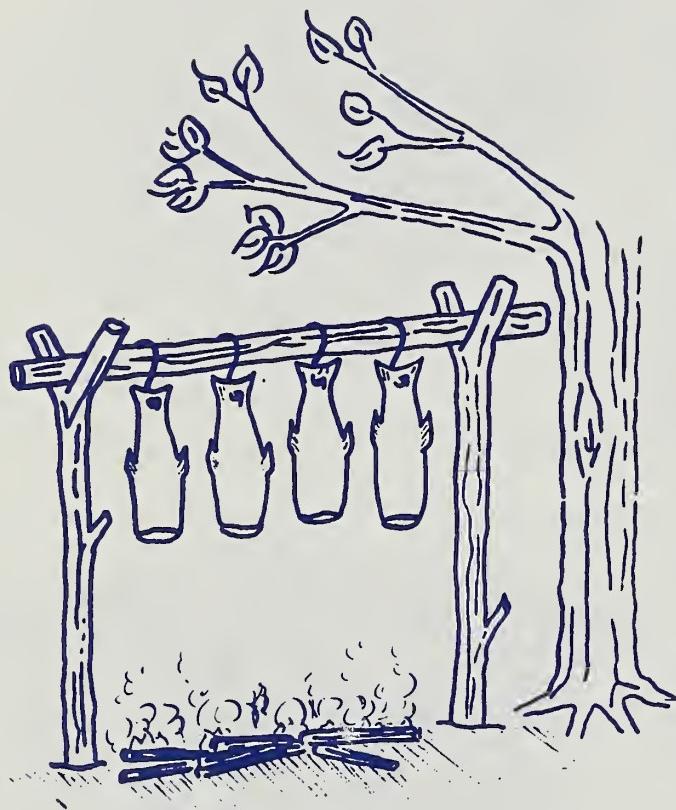
Step 6—Cover whatever kind of container you are using to keep out flies and dirt. Keep it off the ground to help keep ants, other insects, and animals away from it.

Step 7—Keep the container in a cool place where air can circulate around it.

Step 8—Let the fish stay in the brine or dry salt for a week or ten days. Wet salting may take a little less time if fish are of medium size or cut into small pieces. Dry salting goes faster when the weather is warm. If the weather is stormy or damp, leave the fish in the salt until the weather clears.



Step 9—At the end of this time, remove the fish and wash them thoroughly in a fresh strong brine made of three to four cups of salt in one gallon of water. Drain them for 15 to 20 minutes. The fish are now ready for either drying or smoking.



HOW TO AIR DRY FISH

Do not try to dry fish in the rainy season. It can't be done. If the weather is rainy or even damp, the fish may spoil before it dries. In rainy or very damp weather, fish actually "take in" water.

Step 1—Lay the salted fish on a drying rack or hang them from a pole. Do not let them overlap. Be sure the air can reach the fish from all sides, around and underneath, as well as on top.

To make a *drying rack*, stretch chicken wire over a wood frame. The frame should be on legs about four feet high. You can also use thin poles or a loosely woven bamboo mat instead of chicken wire.

To make a *drying pole*, stick hooks in a pole. Hold the pole off the ground with two forked poles. Hang the fish from the hooks.

Step 2—Fish will look better and taste better if they are dried mostly in the shade without any hot mid-day sun directly on them. A good way to do this is to put them out in the morning sun for two or three hours and then move them to shade where the breeze can blow across them.

Step 3—Build a small smoky fire under the fish for the first day to keep flies off it. Turn the fish every hour or two, so the smoke will get to all sides of the fish.

Step 4—After the first day, cover them with a thin cloth or netting to keep the flies off. Do not let the cloth rest on the fish. If you use a drying rack, turn the fish three or four times a day during the rest of the drying time. If you use a drying pole, be sure the air can circulate all around the fish.

Step 5—At night, move the fish under cover where air can move around them, but where no rain, dew, insects or animals can reach them. Put a cover of cloth, paper, or leaves over the racks or poles so no dampness can get to the fish. Fish may sour or mold if they become damp or if dry air cannot move around them.

Step 6—How long fish take to dry depends on how big they are, what kind they are, and how dry the air is. Small fish will dry in about three days if the air is dry. Larger fish take a week or 10 days. To tell when fish are dry, press the thick part of the flesh between your thumb and forefinger. If you cannot make a dent, the fish are dry enough.

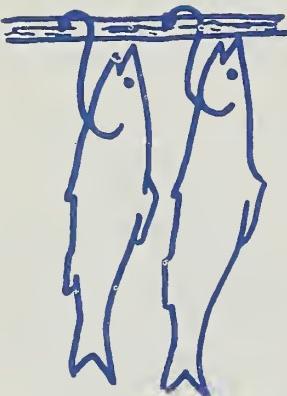
Step 7—Put the cured fish in baskets. Cover the baskets with clean paper, large dry leaves, or thin clean material to keep flies off. Store them in a cool, dry place, off the ground.

Step 8—Watch all cured fish for signs of spoilage. How long fish will keep after curing depends upon how well it is cured, how well it is stored, and whether the weather is damp or dry.

About every two weeks, put the fish out in the sun again for one to three hours, then store them away again as before. Watch the fish for any signs of spoilage, such as mold, rust or reddening. If they show any mold or reddening, scrub them in a strong brine made of three to four cups of salt and one gallon of water. Dry them in the air again for a day or two. Keep them covered with a thin clean cloth.

Dried fish must stay dry to keep. Do not try to store dried fish during the rainy season. It is likely to spoil and make you sick if you eat it.

TO SMOKE FISH



When smoking is properly done, it gives a cured fish of high quality, attractive appearance and good flavor. How well smoked fish keep depends on how well the smoldering fire dries them. The smoke is mainly for flavor and color.

The salted fish should be well-drained before they are put to smoke. If they are wet, steam will form and the fish will soften before they start to dry.

1. How to Hang Fish for Smoking

Fish may be hung with:

S-shaped iron hooks. Hook one end through the belly slit of small whole fish. Hang these hooks over sticks running from one side of the smoke shed or barrel to the other.

Round wood sticks. If fish are whole, you can insert round wooden sticks under the gill flap and through the mouth. Open the belly cavity with two short sticks as shown so that the smoke will get inside.

Square sticks with nails driven through. This is a good method for fish split into fillets or strips. Drive the two nails all the way through the stick. Use two nails for each fish. The distance between the nails will depend on the size of the piece of fish to be hung. Hang each side of a fish fillet on a nail point. Bend the points up slightly to keep the fish from slipping off.

Small iron rods. 1/4 inch in size. Run the iron rods through the fish just under the hard bony plate at the neck —one rod on each side. Each piece of fish will hang from two rods. Do not let one fish touch another. The smoke must circulate all around each piece of fish.

2. Fuel to Use in Smoking

Dry fruit trees make excellent fuel when they are available. They give a very good color and flavor to the fish. Scrub or live oak, hickory, palmetto roots, and river mangrove are hardwoods that also make good fuel.

Hardwood sawdust and chips are better than large pieces of wood as they make more smoke. Green wood is better than dry wood. It makes more smoke.

Dry corn cobs and coconut husks are both good fuel, but you must watch the fire carefully or it will flare up and become too hot.

IMPORTANT: Never use "fat" wood such as pine or any wood that has resin in it. The fish will pick up the odor and taste bad.

3. How to make a "Smokehouse"

To make a small, closed shed:

Use scrap lumber, bamboo, palm leaves, metal or other available material. Make the shed at least six feet high and large enough to hold all the fish to be smoked.

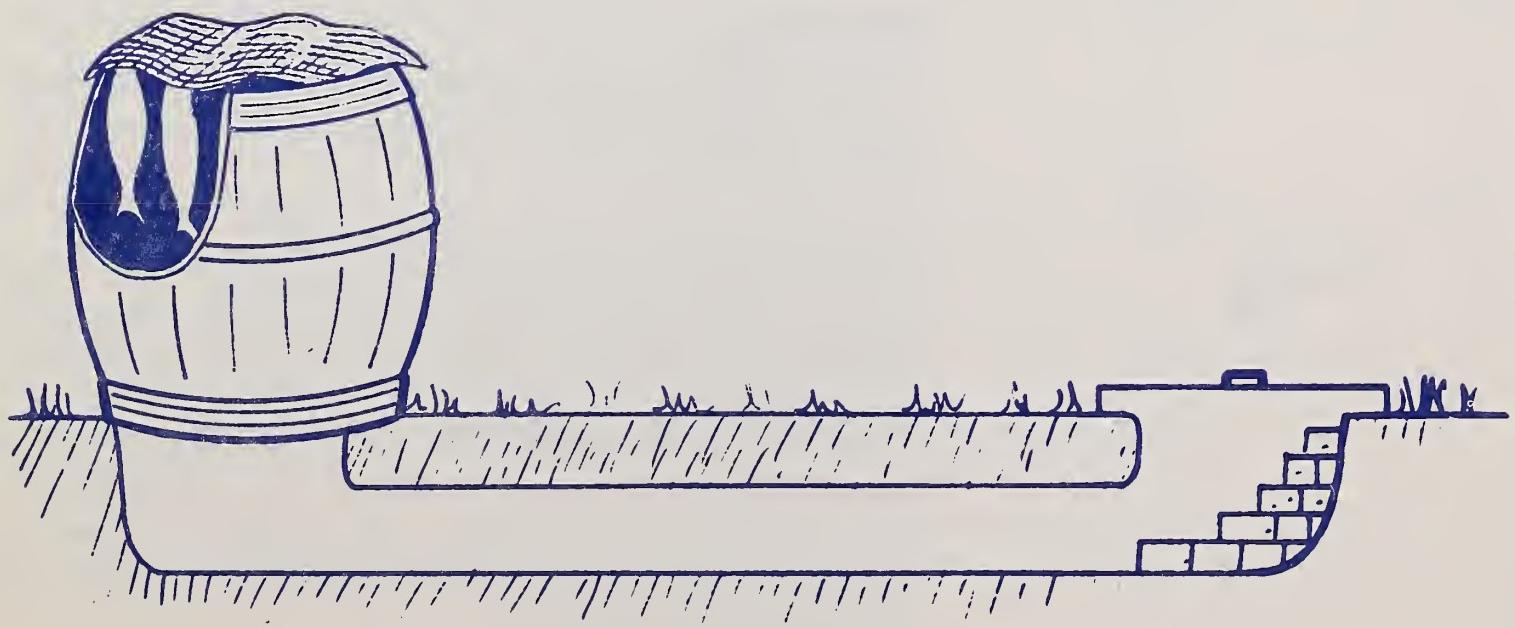
Build a wooden framework or racks inside the shed to support sticks, rods or hooks for hanging the fish. The frame should begin about three feet from the bottom of the shed and extend up to the roof.

You can either hang the fish or lay them on the racks. If the fish are to be hung, make the racks far enough apart so the longest fish can be hung without touching the one underneath.

To use a barrel or oil drum:

You can make a smokehouse for a few fish at a time by knocking out the ends of a large barrel or oil drum.

Dig a hole about two feet deep and small enough in diameter for the barrel or oil drum to fit over it. About 12 feet from the first hole, dig another hole.



Connect the two holes with a trench. If you have a stove pipe or metal tube, you can put it in the trench to connect the two holes. If these are not available, you can use flattened kerosene tins or a board as a cover. Cover whatever you use with the loose dirt you took out when you dug the trench.

Set the barrel or oil drum over the first hole you dug. Nail wooden strips inside the barrel a few inches below the top on opposite sides. Rest the ends of the sticks on which the fish are strung on these strips. If you use an oil drum, make some holes in the sides. The ends of the sticks on which the fish are placed can be put through these holes.

Place a loose fitting cover over the top of the barrel. Cover the second hole with a piece of tin, but leave air space. During the smoking process, you will build a fire in this hole.

Be sure the hole in which you build the fire is on the side from which the wind blows. The smoke should be drawn through the tunnel into the barrel containing the fish.

4. Methods of Smoking

Either a shed or a barrel can be used for smoking. The fish can be hung or laid on racks.

When all the fish have been put into the shed or the barrel, close the openings. Build a low, smoldering fire on the ground in the shed. If you are using a barrel, build the fire in the second hole.

There are two methods of smoking fish—*cold smoking* and *hot smoking*.

Cold Smoking:

This method is generally thought of as “long smoking.” It takes five to seven days, depending on the size and thickness of the fish.

In cold smoking, the fire must be kept very low and steady. If you are using a barrel or oil drum, the first must be built in the second hole. This second hole should be some distance from the barrel. Even then the fire should be kept low.

Watch the fire carefully. Do not let the fire die out at night. *DO NOT LET THE FIRE FLARE UP* and become too hot. Never let the fish get too warm. The smoke and warm air should dry the fish, not cook it. They will dry out slowly and also get the smoked flavor.

Another reason for careful watching is the danger that the fire may flare up and set the smoking shed or even the house on fire.

How long cold smoked fish will keep depends on how salty they are and how dry they are. The longer they are in the smoke the drier they will be. Fish cold smoked only a few hours will keep only a short time. To keep longer than a few days, fish must be smoked five days or longer. How much longer depends on the thickness of the fish.

When the fish are dried, remove them from the smoke and let them cool. Then wrap them loosely in clean paper. Pack the fish in baskets or boxes. Cover the boxes and store them in a cool, clean, dry place off the ground. Dried fish must be kept completely dry.

Hot Smoking:

Hot smoking of fish is really slow cooking. The salted fish are put close to an open fire. The air around them should feel very warm to the hand. However, if you cannot keep your hand in the smoke, it is too hot. If it is that hot, it will cook the fish quickly.

You can use some of the same types of equipment that are used in cold smoking. Do not use a shed that might catch fire. If you are using a barrel to hot smoke fish, you can put the fire in a hole directly under the barrel. Dig a hole in the ground about two feet deep and small enough for the "smoke-barrel" to fit over it.

If you are using a metal barrel or oil drum, you may make the fire inside the barrel instead of digging a hole. However, you must be very careful to keep the fire very low with no flames when it is this near the fish.

Cut an opening in one side near the bottom of the barrel or drum to control the fire. Use a low smoldering fire for the first eight hours. Be sure it does not flare up and scorch the fish. Then build up the fire to make dense smoke for two to three hours longer.

When fish are smoked, cool them for two to three hours. Brush them with vegetable oil while they are still warm. The oil forms a light coating that helps keep the fish. Wrap the fish loosely in clean paper and store them in a cool, clean, dry place. Hot-smoked fish taste good, but they keep only a short time.



HOW TO USE CURED FISH

Cured fish needs to be "freshened" before it is used. Soak the fish in cold water overnight or as long as 48 hours. Change the water several times. Freshening may also be done by breaking the fish into large flakes, putting it in cold water and heating it very slowly, but *not boiling* it, for 30 minutes to 1 hour. This is called simmering. Fish that are very salty and very dry may need to be soaked in cold water and then simmered.

Be sure to cook all cured fish before eating it. Cured fish can be cooked and served in many different ways. Some general suggestions are given here but, most people have their own favorite way of cooking, seasoning, and serving cured fish.

Fish Soups and Stews

You can make a good-tasting soup or stew by cooking dried cured fish in liquid with many different kinds of vegetables. Use water the fish was simmered in when you freshened it. Some of the vegetables most commonly used for soups and stews are yams, rice, tomatoes, onions, and potatoes. You can also use okra, peppers, spinach, or other green leaves, groundnuts, and pimiento. Season soup and stews to suit your own family's tastes.

Broiled Cured Fish

Wash and freshen the fish. Drain, dry, and sprinkle it with cooking fat or oil. Place the fish on a metal rack, flesh side up. Place the rack several inches above hot coals. Cook the fish for 3 to 4 minutes, then turn it over and cook it about 4 minutes more. How long it will take to cook all the way through depends upon the size of the fish. Thick pieces take longer.

Baked Cured Fish

Freshen the fish, then wash and dry it. Place it, flesh side up, in a greased pan. Sprinkle it with cooking fat or oil. Cover it with milk or a combination of milk and the water you simmered the fish in when you freshened it. You may add cut-up vegetables and seasonings if you want to. Place the pan in an oven and bake the fish for 20 minutes to 1 hour depending on the thickness of the fish. Add more liquid as the liquid in the pan evaporates. Take the fish out of the pan and place it on a serving dish. Melt some butter in the liquid that is left and pour it over the fish. Serve the fish while it is hot.

Plain Cooked Fish

Wash and soak the fish in cold water overnight or longer. Change the water occasionally. Put the fish in a deep pan or skillet. Cover it with cold water and heat it very slowly until it is almost boiling. *Do not let it boil!* Boiled fish tends to fall apart. Simmer the fish until it is tender. This may take an hour or more. Skim off the scum. Lift the fish onto a hot platter. Put oil or melted butter and pepper over the fish and serve. You can also use this cooked fish in many other ways. Be sure to take the bones out before using the fish.

Creamed Fish

You can make creamed fish by adding flaked, cooked fish to a sauce. Make the sauce by cooking fat, flour, and liquid such as the water the fish was cooked in, milk or plain water together. Add some flaked boiled fish and seasonings, mix well, and heat. Serve the creamed fish with bread, potatoes or rice.

Fish Cakes

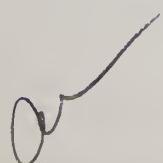
You can make fish cakes with potatoes or yams. Peel the yams or potatoes. Cut them into small pieces and cook them until they are tender. Drain the yam or potato and mash it. Add flaked boiled fish, a lightly beaten egg, and seasonings. Shape the mixture into cakes and roll them in meal or flour. Brown them lightly in a little hot fat or fry them in deep fat until they are golden brown. Drain the fish cakes and serve them hot.

Scalloped Fish

You can mix flaked fish with cooked rice, and then add some milk and well-beaten egg. Pour the mixture in a pan and bake it in an oven. This makes a very tasty food called scalloped fish. You can add seasonings to please yourself and your family.

Season to Your Taste

However you cook cured fish, the kind and amount of seasoning you use will depend on the way you and your family like your food to taste. Vegetables and cooking fats and oils add flavor to fish. People in most countries also add other seasonings. Some seasonings that go well with dried cured fish are hot pepper, dried ground pepper, curry, paprika, locust bean. Be careful if you add salt. You may not have soaked out all the salt used in curing the fish. If you add more salt when you cook it, it may be too salty.





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POINTS TO REMEMBER

1. Handle freshly caught fish with care.
2. Clean fish as soon as you kill them.
3. Wash cleaned fish thoroughly in safe water.
4. Thoroughly wash all equipment and utensils before you use them.
5. Carefully follow directions for salting and drying fish.
6. Protect fish from flies, other insects, and animals while it is curing.
7. Do not try to cure fish during the rainy season.
8. Wrap and store cured fish in a dry place and keep it dry.
9. Watch cured fish for any signs of spoilage.
10. Cook all cured fish before eating it.

